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ture in general. Whether it will prove to be full enough and sufficiently accurate to be quite helpful we are not able to say, not having as yet had the opportunity of giving it a prolonged trial in the laboratory, but a somewhat careful examination of the pages pertaining to a few of the familiar genera has impressed us favorably.

The chapter on phylogeny brings out the author's views as to the nature of lichens, views which, as stated above, are essentially those of Reinke. He holds with the Schwendenerians that the fungal symbionts of the Ascolichens are derived from the Ascomycetes, and these represent different groups of fungi, *e. g.*, Pezizaceæ, Patellariaceæ, Phacidiaceæ, Stictidaceæ, Sphaeriaceæ. With Schwendener also, he refers the 'gonidia' to various algal types. By returning to the second chapter we learn that the relation between fungi and algae is considered to be the highest form of mutualistic symbiosis, which he terms individualism. This requires "that one of the symbionts be absolutely dependent upon the mutual relationship." In lichens, our author says: "We find the nutritive interdependence so marked that a new individual is formed, which in its morphology and physiology is wholly different from any of the symbionts." Again: "From the very nature of individualism it is evident that the resulting structure is a morphological unit in the full sense of the word—that is, a lichen is neither a fungus nor an alga, but a new individual which should be given a definite position in the vegetable kingdom. It is an independent individual, because we find that on separating the symbionts the individual is destroyed, as has already been indicated." We have thus a new kind of taxonomic unit, consisting of two organisms—(a) that derived from fungal ancestors, and (b) that derived from algal ancestors. This dual thing is the lichen. Hence, lichens, being entirely unlike anything else under the sun, are to be regarded as constituting a distinct class! We have thus a nominal restoration of the Class Lichenes, for which the lichenologists have been fighting for a quarter of a century. But what a restoration! A lichen is no longer a single organism, comparable to a *Fucus*, a *Polysiphonia* or a *Marchantia*, but a

compound of two organisms, and these admitted to be of fungal and algal origin. When it comes to this, the autonomists might as well surrender and come at once into the Schwendenerian camp.

It but remains for us to say that this book, with all its shortcomings, will be useful, and that the publishers have done well in their selection of type and paper, and have furthermore given it a substantial binding.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

Organic Chemistry for the Laboratory. By W. A. NOYES, PH.D. Easton, Pa., Chemical Publishing Co. 1897. 12mo. Pp. xi+257. Price, \$1.50.

Two purposes have been kept in view by the author in writing a new book on organic preparations. "The first has been to furnish the beginner with sufficiently full and accurate directions, and clear, concise, theoretical explanations of processes which have been found successful in practical laboratory experience. The second object has been to furnish the more advanced student and practical worker with a guide which will aid him in the selection of processes which are likely to be successful for the preparation of compounds which he may desire to use." The book is divided into eleven chapters, in which is described the preparation of the various classes of organic compounds, namely: Acids; derivatives of acids; halogen compounds; nitro compounds; amines; hydrazo, azo, and diazo compounds, etc.; alcohols and phenols; aldehydes, ketones and their derivatives; sulphonic acids and sulphine compounds; hydrocarbons, and miscellaneous compounds. At the beginning of each chapter is a discussion of the chemical reactions involved in the different methods of preparation. This is followed by directions for the preparation of a compound illustrating each method. For example, in the first chapter twelve pages are given up to a general discussion of acids and nineteen preparations are described. In all cases the theoretical explanations and experimental details are clear and full. A particularly valuable chapter is devoted to the qualitative identification of organic compounds. The usual tests

for elements other than carbon are described, and then an account is given of the typical reactions of the classes of organic compounds (hydrocarbons, phenols, amines, etc.). By means of a melting-point or boiling-point determination, a qualitative ultimate analysis, and the application of the reactions described, a large number of compounds can be easily identified.

The descriptions of such important laboratory operations as crystallization, distillation, etc., are but meagre and are scattered throughout the book. Most of them are described in the first chapter, which treats of the preparation of acids. As the student will make scarcely more than two or three of these compounds, and probably not at the beginning of the work, he is compelled to refer to the index and search out, from the details of one or more experiments, the description of the process which he wishes to use. Filtration is discussed, for example, on pages 21, 29 and 57; crystallization on pages 27 and 54, and distillation on pages 13-15, 19, 46 and 48. The book will be particularly valuable to the advanced worker in organic chemistry on account of its logical and thorough treatment of the subject, the numerous references to the literature, and the fact that it includes the recent work of importance.

JAMES F. NORRIS.

SOCIETIES AND ACADEMIES.

THE ALABAMA INDUSTRIAL AND SCIENTIFIC SOCIETY.

THE regular winter meeting of this Society was held in the city of Birmingham, on the 21st of December, Truman H. Aldrich, President, in the chair.

W. M. Brewer, of the Committee on Statistics, reported that he had collected and had published, in the technical journals of the country, monthly during the present year, the statistics of coal, coke, iron-ore, limestone and other mineral productions of the State. By the end of the first week in January he expected to have ready for publication, in the Proceedings of the Society, the complete mineral statistics for the year 1897.

With reference to the approaching Exposition at Omaha it was the sense of the Society that the State of Alabama should be represented there by a full and well arranged exhibit of its mineral and other natural resources. Four new members were elected, and a committee, consisting of Mr. James Bowron, Mr. J. H. Fitts and Dr. Wm. B. Phillips, was appointed to represent the Society at the River and Harbor Convention, which is to be held in the city of Tuscaloosa on the 29th of December. To this committee the President of the Society was added.

M. Henri Cardoza, a Commissioner of the French Government to investigate the labor conditions of this country, was presented to the Society by Dr. Phillips, and made some remarks explanatory of his mission.

Mr. Mason H. Sherman then read a paper, prepared by Wm. Blauvelt, on 'The Semet-Solvay Coke Oven and its Products.' This paper gave a very full account of the retort oven plant which is now in course of construction at Ensley, near Birmingham, and which is the sixth installation of by-product ovens in this country. The coke, tar, ammonia, gas and other by-products of these ovens were treated in detail by Mr. Blauvelt. As usual, this subject gave rise to an animated discussion, in which Dr. Phillips, Mr. Aldrich and others took part. Inasmuch as recovery-ovens and by-product plants have occupied a very prominent place in the papers read before this Society and in the discussions thereon during the past six years, it is believed that the installation of the plant at Ensley is the direct outcome of the persistent efforts of this Society to put a stop to the appalling waste incident to the use of the old bee-hive ovens.

Dr. Phillips then read a paper on 'Some of the Results of Washing the Alabama Coals for Coking,' in which he presented a number of tests carried out by him upon the cokes from the different coals mined near Birmingham, and coked under different conditions. This paper is from advance sheets of a new edition of 'Iron Making in Alabama,' by Dr. Phillips, soon to be published as a Bulletin of the Geological Survey.

President Aldrich then spoke of the great quantity of low-grade, free-milling gold ores